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many kinds; and those little dark gray moths that cling so cunningly to bark of various trees during the day—almost invisible to human eyes, but easy forage for the Arizona Jay. How well it assists in Uncle Sam's reforestation problem is apparent, when a steep hillside, devoid of arborescent growth, is watched closely during acorn season, provided it is the one selected by the Jays for their winter granary. The number of birds you would see journeying back and forth in the course of a few days might cause a mental convulsion, let alone attempting to count the acorns deposited. The ground universally selected contains much rubble, running to small fragments, say the size of a man's fist. Generally the acorns (for several are often deposited in one spot) are pushed under the side of the stone nearest to or facing the ravine; a wise provision for the birds' future, and a fortunate one for the possible future oak, as it guards against washing out in times of heavy rain; likewise conserving moisture in the months of drouth. The spring and summer of the present year (1907) were dry, very dry; yet in many slopes seedling oaks were growing vigorously. No parent oak in the vicinity grew at a higher level; and as the acorn is quite too heavy to be transported by wind action—at least upward—one may figure out conclusions.

Perhaps the Woodhouse Jay (*Aphelocoma woodhousei*) is resident, but I am convinced that, if so, they number but a fraction, when compared to the portion of the species that migrate here; and it was the visiting body that came to my attention. None were seen until September 21; next day found it fully represented; so by October 1 a comparative estimate of numbers would put this species and *A. s. arizonæ* on equal basis, with balance of power held by the Long-crested Jay (*Cyanocitta stelleri diademata*) which held forth in the pine zone until the end of September. After that, a few adventurous individuals wandered down as low as 4500 feet.

Barren was the opportunity for the study of water birds. In addition to an infrequent visit by Killdeer (*Oxyechus vociferus*), but a single kind came to be noted: A flock of eleven Black-crowned Night Herons (*Nycticorax nycticorax naevius*) spending the morning of September 10 in a deep narrow canyon near the 4000 foot level.

Benson, Arizona.

SOME NOTES ON THE GREAT BLUE HERON

By H. W. CARRIGER and J. R. PEMBERTON

FOR a good many years a large number of Great Blue Herons (*Ardea herodias*) occupied a large nesting colony upon the tops of some eucalyptus trees at Redwood City, California. Thirsting for knowledge, and particularly bird-egg knowledge, the Redwood small boy made yearly trips to the heronry to study the inhabitants thereof, and so vigorous and attentive were their studies that the proud and classy Blue Herons declared a moving day, and the spring of 1900 found the once fruitful Mecca of the bird-egg boys a dreary and lonesome spot, except for a bunch of English Sparrows, who took possession of the old nests.

Mr. Chase Littlejohn, well known to most Cooper Club members, often wondered where the colony had moved to because the birds were as numerous as ever upon the marsh land between Redwood and the Bay. One day in 1902, Mr. Lit-

John happened to be hunting Clapper Rails' eggs when he stumbled upon the new heron colony, away out on the marsh, and flat upon the ground.

In May, 1903, the writers made a flying visit to this interesting heron colony and determined to visit it at some later date with the purpose of making a study of the colony.

Early in the morning of April 14, 1907, we got into a row boat at Redwood City and commenced a four mile row, following the winding sloughs. Many shore and marsh birds were surprised. At this date most of the waders and sandpipers were in flocks preparatory to their migration. Among the birds seen were *Numenius longirostris*, *Symphemia semipalmata inornata*, *Ereuntes occidentalis*, *Rallus obsoletus*, *Nycticorax naevius*, *Calidris arenaria*, *Merganser serrator*, *Arenaria melanocephala*, *Melospiza pusillula*, several species of ducks and a few gulls. An occasional solitary Blue Heron flying overhead kept us reminded of our



A CORNER IN THE TERRESTRIAL COLONY OF GREAT BLUE HERONS;
YOUNGSTERS IN WADING

quest and tho rowing was tiresome we kept at it.

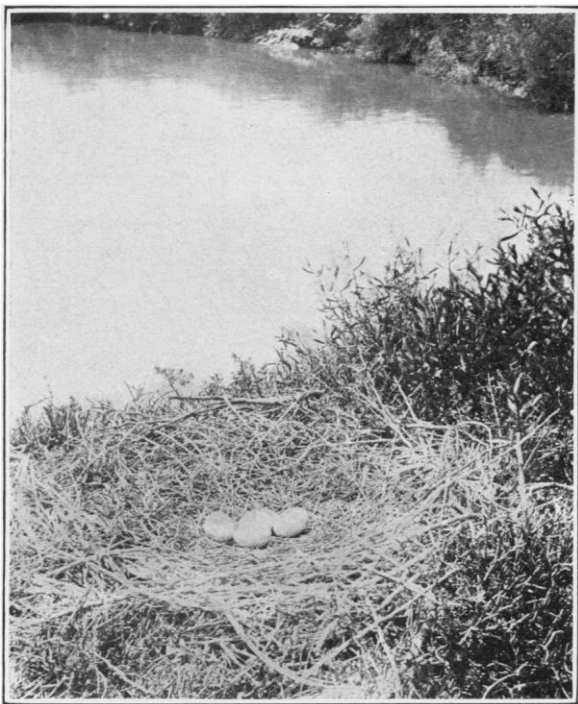
Soon the slough connected with a large open channel and the Bay itself was seen. Thinking we must be near the colony, we landed on the bank and saw it to be about a half-mile further on. Herons were arriving and departing from all directions, and with our glass we could see some 50 or 60 herons standing around.

Resuming rowing we made for a landing place within one-fourth mile of the colony and another peep was taken from the bank. This time a new scene was displayed. The Herons had seen our approach and no flying birds were evident, while those which were at the colony before, were now walking stealthily away. Wishing to get a photograph of the flock of birds we rowed rapidly toward them, and altho completely hidden from the birds while rowing, when we made our final landing the birds had moved a considerable distance away, too far to photograph. As soon as we stood out on the marsh land and took a few steps toward the flock,

they rose as one and finally lit about a quarter of a mile away where they remained until our visit was over.

Young birds not quite able to use their wings were walking away about 100 yards off. Others not so large were hiding in bunches of grass and in the shelter of slough banks. When we were within the colony proper one-third of the nests were vacant and their young were walking around somewhere, to be kicked up by our feet almost anywhere.

The colony consisted of 49 nests and covered an area of about 200 feet by 100 feet. The nests were built always upon the very edge of the little sloughs of three or four feet depth, and were sometimes within five feet of each other and as far as twenty feet apart; but usually about ten feet was spaced between nests. All nests were constructed of the dried branches of the common marsh grass, and were quite



TYPICAL NEST AND EGGS OF THE GREAT BLUE HERON

serviceable structures. They varied in size from two feet in diameter flat on the ground to four feet across and 14 inches in high. Nearly all nests were built upon an old one, and probably in a few years quite high monuments will be erected. The contents of the nests varied from fresh empty nests to those containing young about big enough to find their way home again. Sets of eggs were 2, 3 and 4, and both fresh and incubated eggs were plentiful.

The young birds were of course the most interesting to study. One lone youngster just hatched was trying to eat up his shell. The noise of the squeaking beauties(?) at times was quite inconceivable, especially from the ones about three weeks old. These had raised a good growth of feathers, and being about the size of good "broilers" were

able to be both seen and heard.

They would make frantic efforts to spear us when we were within ten feet, and especially during the focusing of a camera they were never still. So rapid were their spear-like thrusts that most of the pictures are a blurred streak. The young birds which still retained their down were the least interesting. They would sit quietly until poked, when they would rise up and make ready to bite the intruder. Their noise was quite different from the large birds, being a continual low lonesome cluck.

Some of the little fellows were suffering from the heat and it is probable that when weak from hunger many die under the blistering summer sun.

Some of the young birds were about the size of a Bittern, and these were con-

stantly walking about the colony, occasionally walking about in the water as one photo shows. It is interesting to imagine how such apparently restless birds could ever stay within the limits of a nest in the top of a tall tree.

One very interesting feature of the young birds were the differences in the sizes of one brood. In one nest there were four young, the smallest about the size of a quail, while the largest would have outweighed a Canvasback. In some nests a dead bird could be seen beneath the feet of its brothers, and many nests were seen with only two half-grown birds in it and with the rotting remains of the other two birds beside the nest.

After collecting several sets of eggs we left the heronry and took our long tiresome row back home, swearing to come "via launch" next time. But on May 12th we again visited the colony by rowing out, and found everything much the same as it was a month before. Young in all stages of growth were present, also fresh eggs.



THE NOISY AND COMBATIVE STAGE

Allowing three weeks for eggs to hatch, and four, tho five is probably more correct, for the birds to be reared, our observations tend to show that the colony was in active operation from March 1st to July 1st.

Several Japanese oyster men were seen on our second trip and they told us that no one ever went near the colony. It is thus evident that the herons have now an isolated and safe place to rear their young, and also are in the center of their fishing ground which is quite an item considering that at their old colony food had to be carried six or seven miles to their young.

The eggs are of the usual pale greenish blue color, and sets number 2, 3 and 4, with three and four about equal in occurrence. The eggs vary somewhat in size from a short fat variety to a long sharply pointed size. The average of 8 sets at hand is 2.48 x 1.80 inches. This shows them to be .30 inches wider than most zoological works give them to be.

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